

Late Pliocene Hawfinches (*Coccothraustes* Brisson, 1760) (Aves: Fringillidae) from Bulgaria

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Introduction

Recent Hawfinches (*Coccothraustes* Brisson, 1760) are represented by 9 species: 1 of Nearctic, 1 of Neotropic and 7 of Palearctic and of Indo-Malayan distribution. Four subspecies are recognized within the nominate species *Coccothraustes coccothraustes* (Linnaeus, 1758). *C. c. coccothraustes* is the only subspecies spread throughout Europe (HOWARD & MOORE, 1980; CRAMP & PERRINS, 1994).

Ecobiogeographical notes on *Coccothraustes coccothraustes*

The recent hawfinch *C. coccothraustes* is a resident and migratory species in the temperate zone. It inhabits deciduous broadleaf and mixed forests and prefers wood habitats near the rivers and lakes, forest-steppe areas, both in the lowlands and the mountains. Winter migrations are caused by the lack of food resources (HARRISON, 1982). The breeding range lies between 17° C and 25° C July isotherms. It is most specialized to oak-hornbeam forests. The hawfinch inhabits the forests of *Fagus*, *Ulmus*, *Fraxinus* and *Acer*, as well as mixed forests up to the tree-line at 1300 m a.s.l. Recently the range of the species is slightly extended westwards (CRAMP & PERRINS, 1994). *C. coccothraustes* is a representative of the woodland avifauna, related to the broadleaved forests of the southern type. Its larger range is an indication for its Neogene age, when it had appeared in the wood zone of Eurasia. It is well adapted to the nut-fruit tree-species (*Prunus*) or the tree-species with larger seeds (*Fagus*, *Tilia*, *Acer*, *Fraxinus*). The hawfinch survived during the Pleistocene only in the suitable refugia of the southern European peninsulas where it reduced ten times its former pre-Pleistocene range (MOREAU, 1954a).

Pleistocene and Holocene distribution of *Coccothraustes coccothraustes*

BRODKORB (1978) listed a series of Pleistocene and Holocene locations of *C. coccothraustes* from Ireland, England, France, Mallorca, Sardinia, Malta, Austria, Italy, former Czechoslovakia, Poland, Hungary, Romania, Ukraine, and Israel. In the more recent literature we have found the following sites of the Quaternary distribution of the hawfinch:

Pleistocene: Aurignacian in the Adzhi-Koba Cave in Crimea (VOINSTVENSKIY, 1960), Paleolithic in the Alimovskiy Naves Cave, Suren 1 Cave, Adzhi-Koba Cave in Crimea (BARYSHNIKOV & POTAPOVA, 1992); Middle Pleistocene in Aridos - 1 in Spain (MOURER-CHAUVIRÉ, 1980); „Pre-Wurmian“ in Sutton and Middle Wurmian of Istallosko in Hungary (JANOSSY, 1986); Crimea (DEMENTIEV, 1960); Middle and Late Pleistocene of Corsica, Tavolara, Mallorca, Malta, Crete and Armatia islands (ALCOVER et al., 1992); Early Paleolithic in Grotta dei Fanciulli in Balzi Rossi (CAMPANA, 1946), final of the Wurmian 3 (20 000 B.P.) - the Middle of Wurmian 4 (12 500 B.P.) in Arene Candide (CASSOLI, 1980) in Italy; Wurmian 2-3 in La Balauzierie in Monaco (BONIFAY, 1966); Wurmian 3 (28 000 B.P.) to Postglacial (ca. 4000 B.P.) in a number of sites from S France and Catalonia in Spain (VILETTE, 1983); Wurmian in the Shandaja Cave in Croatia (MALEZ-BACIC, 1979); Paleolithic in Palestine (TCHERNOV, 1962); Mesolithic in Demen's Dale (BRAMWELL & YALDEN, 1988), Late Pleistocene in Chudleigh Fissure, Torbryans Caves, Happaway Vave (NEWTON, 1923; HARRISON, 1980) in the Great Britain; Late Pleistocene in the Velika Pecina Cave in Croatia (MALEZ-BACIC, 1975); Late Pleistocene in Crvena Stjena in Montenegro (MALEZ & MALEZ-BACIC, 1974a); Middle to Late Villafranchian in the Sandalija 1 Cave and Late Pleistocene (Wurmian 2) in the Sandalija 2 Cave in Croatia, Ortus in France and Grimaldi in Italy (MALEZ-BACIC, 1979; MALEZ & MALEZ-BACIC, 1974b); Late Pleistocene (Aurignacian) in the Istallosko Cave in Hungary (JANOSSY, 1954); Crete (WEESIE, 1988); Wurmian 3 in Grotte Napostileu in Romania (KESSLER, 1977a); Paleolithic in L'Abri du Facteur a Tursac in France (BOUCHUD, 1968), Magdalenian (14 380 - 12 980 B.P.) in Pierre-Chatel (DEBROSSE & MOURER-CHAUVIRÉ, 1973), Wurmian 2 in l'Hortus and de Combe-Grenal (BORDES et al., 1972), Magdalenian in Morin (CHAUVIRÉ, 1965), Mindel and Wurmian 3-4 in the Pyrenees (CLOT & MOURER-CHAUVIRÉ, 1986), Magdalenian (13 060 - 13 370 B.P.) in Cantet (Espeche) in the French Pyrenees (CLOT et al., 1984), Magdalenian in the Grotte du Rond-du-Barby in France (MOURER-CHAUVIRÉ, 1974), Tardiglacial in the Jean-Pierre 1 Cave (MOURER-CHAUVIRÉ, 1994) and Wurm 2 in l'Hortus in France (MOURER-CHAUVIRÉ, 1972a).

Holocene: 16-17 century A.D. in Voronkovskiy Grot near Voronkovo Village, 4th millennium B.C. near Botna Village, Eneolithic of Brynzeni I in Moldova (GANJA, 1972); 1-4 century A.D. in Amalda Cave in Spain (EASTHAM, 1990); Early Holocene in the Jean-Pierre 1 Cave in France (MOURER-CHAUVIRÉ, 1994), the Middle Ages (MOURER-CHAUVIRÉ, 1972 b) and Neolithic in the Grotte du Rond-du-Barby (MOURER-CHAUVIRÉ, 1994).

ER-CHAUVIRÉ, 1974), in France and antiquity (the Roman epoch) of Mallorca (BALLMANN & ADROVER, 1970); Vadu-Crisului in Romania (KESSLER, 1977b).

The Pliocene finds of Howfinches in Bulgaria

The fossil material consists of 7 finds and originates from two Villafranchian sites of W Bulgaria (Fig. 1) - Varshtets (MNQ zone 17; 6 finds - NoNo NMNHS 114, 116, 117, 119-121), and Slivnitsa (MNQ zone 18-a; No NMNHS 440). As it is seen from the review of the fossil record of *Coccothraustes*, both sites provide the earliest finds of Howfinches. According to BRODKORB (1978) only two species, *C. coccothraustes* and *C. vespertinus* Cooper (California: Rancho La Brea; Pleistocene) have been known by fossil record up to now.



Fig. 1. Distribution of *Coccothraustes* in Europe: the recent range of *C. coccothraustes* (dotted); *C. balcanicus* sp. n. (1); *C. simeonovi* sp. n. (2) (Drawing: Vera Hristova)

Coccothraustes balcanicus sp. n.

Holotype: Incomplete mandible, chiefly represented by the symphysal part, (Fig. 2); collections of the Fossil and Recent Birds Department of the National Museum of Natural History - Sofia, Bulgarian Academy of Sciences, No NMNHS - 440. Collected

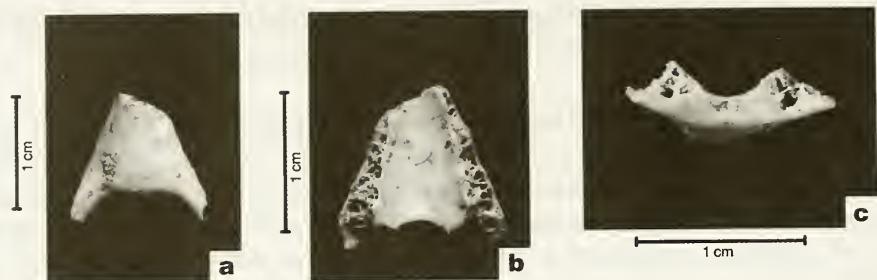


Fig. 2. *Coccothraustes balcanicus* sp. n., mandible (holotype) - NMNHS-440: a - ventral view; b - dorsal view; c - caudal view (Photograph: Boris Andreev)

on 17 September 1993 by Z. Boev.

Paratypes: No additional material was collected and no paratypes were specified.

Locality: A destroyed cave in a rocky hill, now a stone quarry, 3 km WNW from the town of Slivnitsa near Sofia ($42^{\circ} 48' N$, $23^{\circ} 05' E$).

Horizon: Unconsolidated, unstratified bone elements accumulated in the filling of clay terra-rossa. Usually, the fossil bones are broken. All finds are disarticulated.

Chronology: Late Pliocene - Early Late Villafranchian. The associated fauna of large mammals attributes the site to the end of MNQ 18-a zone (= Seneze unit; SPASSOV, 1998).

Etymology: The name *balcanicus* is given after the Balkan Range (Stara Planina) - the main mountain chain of the Balkan Peninsula.

Diagnosis: A Late Pliocene species of *Coccothraustes*, differing from *C. coccothraustes* by the bow-like, but not trapezium-like shape in the middle of the edge that ends the symphysys mandibulae in ventral view.

Collections acronyms: UCBL - Université Claude Béroud - Lyon 1; NMNHS - Natural Museum of Natural History - Sofia.

Comparative Material Examined: The find was compared with analogous skeletal elements of the following species: collections of the UCBL - *C. c. coccothraustes* - 417/1; 417/4; *C. c. japonicus* - 1349/7287; *Pheucticus*

Table 1

Measurements of the mandibula in fossil and recent *Coccothraustes*

Species	a	b	c	d
Fossil				
<i>Coccothraustes balcanicus</i> sp. n. NMNHS-440	11.8	14.0	1.7	2.7
Recent				
<i>C. c. coccothraustes</i> UCBL 417/ 1	13.8	12.7	1.8	1.3
<i>C. c. coccothraustes</i> UCBL 417/ 4	16.0	14.0	1.85	1.6
<i>C. c. japonicus</i> UCBL 1349/ 7287	14.1	ca. 14.6	ca. 2.1	2.2
<i>Pheucticus melanocephalus capitalis</i> UCBL 314/ 7287	9.4	8.3		2.8
<i>Pheucticus ludovicianus</i> UCBL 7546	ca. 10.1	8.4	ca. 1.4	2.3

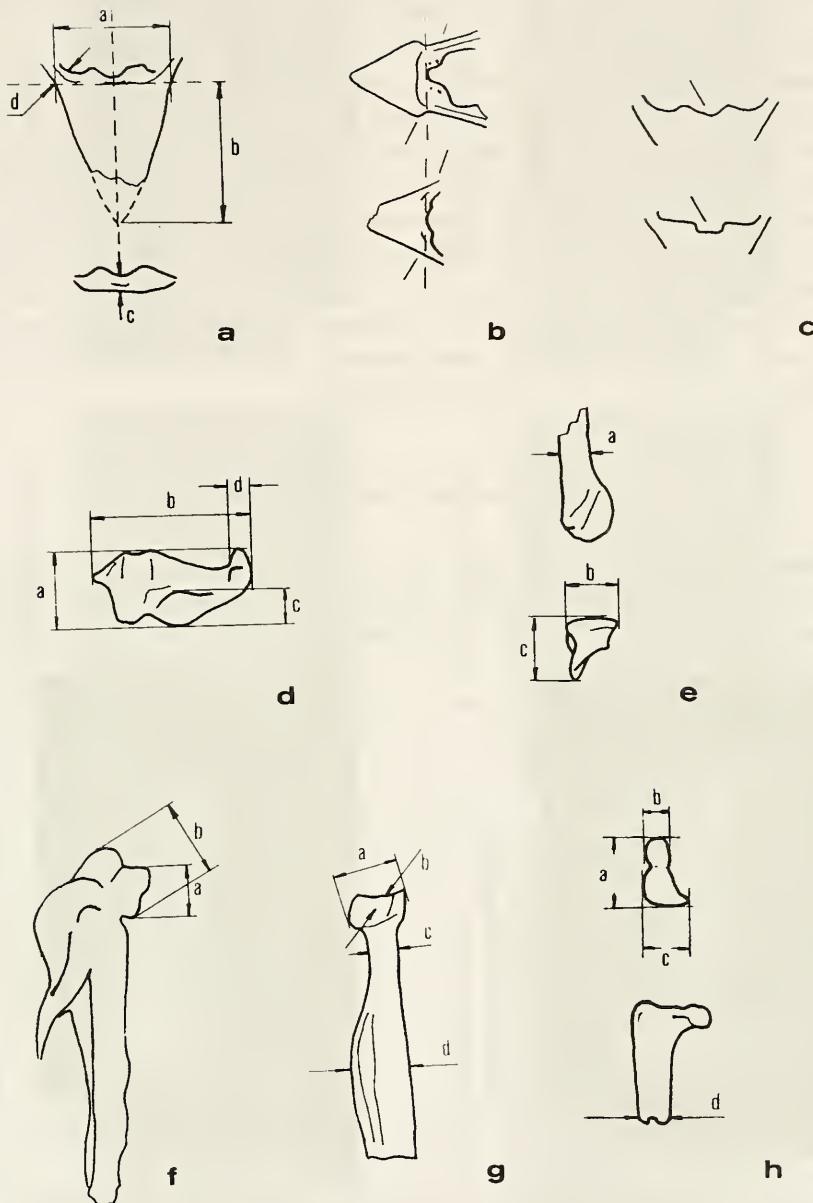


Fig. 3. The manner of measurings and comparison of the bones of fossil and recent *Coccothraustes*: a - ventral (top) and cranial (bottom) view of mandible; b - mandibles of *C. coccothraustes* (top) and *C. balcanicus* sp. n. (bottom); c - mandibles of *C. balcanicus* sp. n. (top) and *C. coccothraustes* (bottom); d - cranial view of humerus dist.; e - ulna sin. dist.; f - carpometacarpus prox.; g - radius prox.; h - femur prox. (Drawing: Vera Hristova)

melanocephalus capitalis - 314/7287; *Pheucticus ludovicianus* - 7546; collections of the NMNHS - *C. coccothaustes* - 1/1982; 2/1989; 3/1996.

Measurements: see Table 1, Fig. 3 a.

Comparison: All osteometrical and morphological features show unambiguous appurtenance to genus *Coccothraustes*. Dimensionally it is closer to *C. coccothaustes*. Both species *Pheucticus ludovicianus* and *Ph. melanocephalus* differ strongly from *Coccothraustes* by their even bow of the inner edge of mandible. *C. c. japonicus* has a slight edge 2. *C. balcanicus* sp. n. differs from *C. coccothaustes* by the bow-like shape in the middle of the edge that ends the symphysys mandibulae in ventral view (Fig. 3 b, c, below). The same edge in *C. coccothaustes* is trapezium-like (Fig. 3 b, c, above). *C. balcanicus* sp. n. also has a more clearly developed bow-like protruberance in the middle of the base of the symphysis on the ventral surface of the mandible.

Coccothraustes simeonovi sp. n.

Holotype: humerus sin. dist. (Fig. 4 a, b). Collections of the Fossil and Recent Birds Department of the National Museum of Natural History, Bulgarian Academy of Sciences, No NMNHS 120. Collected on 25 July 1990 by Z. Boev.

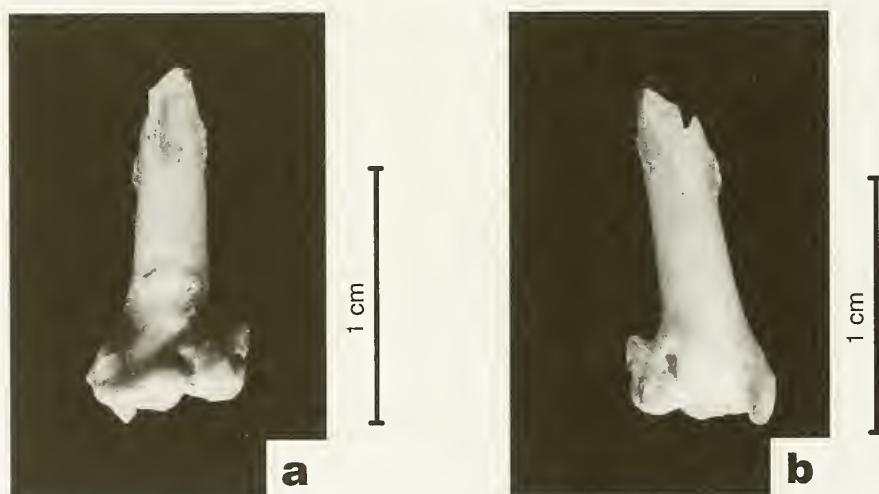


Fig. 4. *Coccothraustes simeonovi* sp. n., humerus sin. dist. (holotype) - NMNHS-120: a - lateral view; b - medial view (Photograph: Boris Andreev)

Paratypes: Topotypes (Fig. 5): radius dex. prox., NMNHS 121; femur dex. prox., NMNHS 114; ulna dex. dist., NMNHS 116; carpometacarpus dex. prox., NMNHS 117; ulna sin. dist., NMNHS 119.

Locality: A ponor in a rocky hill, 6 km NNE of Varshtets ($43^{\circ} 13' N$, $23^{\circ} 17' E$).

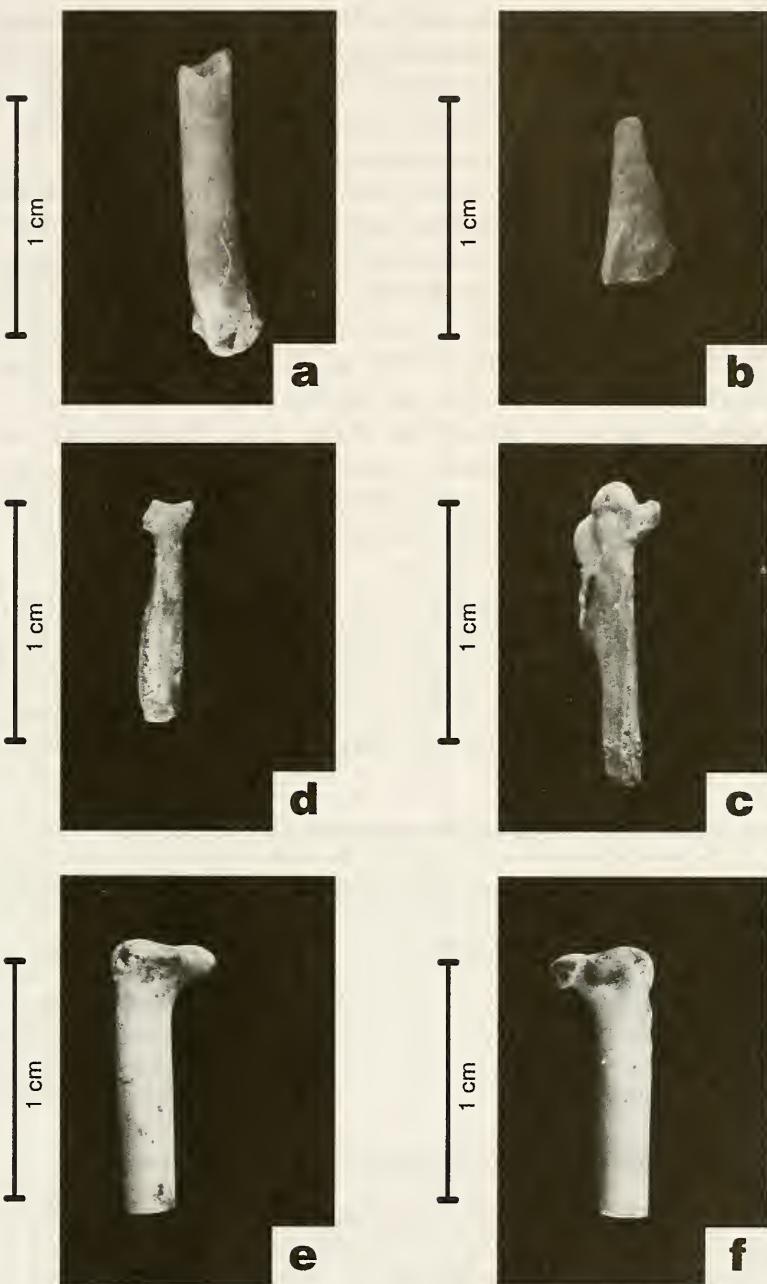


Fig. 5. *Coccothraustes simeonovi* sp. n., paratypes: ulna dex. dist., NMNHS 116, a - medial view; b - ulna sin. dist., NMNHS 119, ventral view; c - radius dex. prox., NMNHS 121, lateral view; d - carpometacarpus dex. prox., NMNHS 117, dorsal view; e - femur dex. prox., NMNHS 114, cranial view; f - caudal view (Photograph: Boris Andreev)

Horizon: Unconsolidated, unstratified sediments accumulated in the filling of clay terra-rossa. The fossil bones are broken, sometimes making a kind of bone breccia.

Chronology: Middle Villafranchian. The associate fauna of mammals (SPASSOV, 1998; V. Popov - pers. comm.) attributes the site to the MNQ 17 zone according to the chronostratigraphical system of GUERIN (1990).

Etymology: The name *simeonovi* is given in honour of the eminent Bulgarian ornithologist, Assoc. Prof. Simeon Simeonov (1937 - 1991).

Diagnosis: A Late Pliocene species, differing from *C. coccothraustes* by the thicker diaphysis and longer epicondylus dorsalis of the humerus. In caudal view of the distal epiphysis it also has a sharper and more dorsally pointed epicondylus ventralis.

Collections acronyms: NMNHS - National Museum of Natural History - Sofia; UCBL - Céntre des Sciences de la Terre at the Université Claude Bernard - Lyon 1.

Comparative material examined: Fossils from Varshets were compared with skeletons of the following species: Collections of the UCBL - *C. coccothraustes* 417/2, 417/6; *Loxia curvirostra* 430/1, 430/2; *Pyrrhula pyrrhula* 427/3, 427/4; Collections of the NMNHS - *C. coccothraustes* - 1/1982, 2/1989, 3/1996.

Measurements: see Table 2, Fig. 3 d.

Comparison: The general shape of the bones suggests a Passeriform bird, mostly resembling the larger Fringillid species. The morphological comparison of humerus, ulna, radius, carpometacarpus and femur suggests a species of *Coccothraustes*. In comparison with the recent *C. coccothraustes*, the fossil species from Varshets shows: No 117 (carpometacarpus prox.) has a sharper

Table 2
Measurements of humerus in fossil and recent *Coccothraustes*

Species	a	b	c	d
Fossil				
<i>Coccothraustes simeonovi</i> sp. n. NMNHS-120	3.3	6.1	1.8	1.5
Recent				
<i>C. c. coccothraustes</i> UCBL 417/ 7	3.3	6.5	1.8	1.3
<i>C. c. coccothraustes</i> UCBL 417/ 8	3.4	6.4	1.7	1.4
<i>C. c. coccothraustes</i> UCBL 417/ 9	3.2	6.2	1.7	1.4

Table 3
Measurements of ulna dist. in fossil and recent *Coccothraustes*

Species	a	b	c
Fossil			
<i>Coccothraustes simeonovi</i> sp. n. NMNHS-116	2.0	2.6	2.8
<i>Coccothraustes simeonovi</i> sp. n. NMNHS-119	2.0	2.6	2.8
Recent			
<i>C. c. coccothraustes</i> UCBL 417/ 7	2.2	2.7	3.3
<i>C. c. coccothraustes</i> UCBL 417/ 8	2.0	2.9	3.4
<i>C. c. coccothraustes</i> UCBL 417/ 9	2.0	2.8	3.2

Table 4

Measurements of radius dex. prox. in fossil and recent *Coccothraustes*

Species	a	b	c	d
Fossil				
<i>Coccothraustes simeonovi</i> sp. n. NMNHS-121	2.05	1.5	1.25	1.8
Recent				
<i>Coccothraustes coccothraustes</i> UCBL 417/ 2	1.9	1.5	0.95	1.3
<i>Coccothraustes coccothraustes</i> UCBL 417/ 6	2.0	1.5	0.8	1.2
<i>Loxia curvirostra</i> UCBL 430/ 1	1.8	1.3	0.8	1.15
<i>Loxia curvirostra</i> UCBL 430/ 2	1.9	1.4	0.9	1.0
<i>Pyrrhula pyrrhula</i> UCBL 427/ 4	1.5	1.2	0.65	1.2
<i>Pyrrhula pyrrhula</i> UCBL 427/ 3	1.7	1.2	0.85	1.3

Table 5

Measurements of carpometacarpus in fossil and recent *Coccothraustes*

Species	a	b
Fossil		
<i>Coccothraustes simeonovi</i> sp. n. NMNHS 117	ca 2.1	1.7
Recent		
<i>C. c. coccothraustes</i> UCBL 417/ 7	2.2	1.7
<i>C. c. coccothraustes</i> UCBL 417/ 8	2.4	1.8
<i>C. c. coccothraustes</i> UCBL 417/ 9	2.2	1.7

Table 6

Measurements of femur prox. in fossil and recent *Coccothraustes*

Species	a	b	c	d
Fossil				
<i>Coccothraustes simeonovi</i> sp. n. NMNHS-114	4.3	1.8	2.3	2.2
Recent				
<i>C. c. coccothraustes</i> UCBL 417/ 9	4.0	1.6	2.6	2.0
<i>C. c. coccothraustes</i> NMNHS 2/ 1989	4.2	1.8	2.5	1.8

processus pisiformis and a bigger processus extensorius; No 116 and 119 (ulna dist.) has a thicker diaphysis and a more proximally positioned last papilla remigialis caudalis; No 121 (radius prox.) has a wider longitudinal crest of the proximal half of diaphysis and a less angular shape of condylus humeralis in dorsal view (length of the fragment - 9,4 mm); No 114 (femur prox.) has a shorter colum femori. The measurements of these finds are shown on Tables 3, 4, 5 and 6 (see Figs. 3 d, e, f, g, h).

Discussion

We consider the Slivnitsa specimen as a representative of an extinct Late Pliocene possible ancestor of the recent Hawfinches in W Palaearctic. We also do not exclude the taxonomical identity of *C. simeonovi* sp. n. and *C. balcanicus* sp. n. Both come from the end of the SE European Middle to Late Villafranchian. Due to the lack of homologous skeletal elements in both sites (mandible from Slivnitsa and long bones of the legs from Varshtets), and the chronological differences (about 0,5 my) we suggest to distinguish the finds from these sites until additional remains are established.

In any case, the late Pliocene finds from Varshtets and Slivnitsa provide the earliest record of the genus *Coccothraustes* up till now.

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Късноплиоценски черешарку (*Coccothraustes* Brisson, 1760) (Aves: Fringillidae) от България

Златозар БОЕВ

(Резюме)

Представени са всичките седем терциерни останки от черешарку в България, произлизаващи от две находища - Сливница и Вършец. Те съдържат най-древните находки на представители на рога и с това са първите находища в света, съдържащи останки от фосилни видове черешарку. Въз основа на тях са описани и първите два фосилни вида в рога.

Coccothraustes balcanicus sp. n.

Холотип: mandibula - симфизна част, № NMNHS 440.

Диагноза: близък предшественик на recentния *C. coccothraustes*, отличаващ се от него по дъговидната форма на средната част от ръба, завършващ symphysis mandibulae във вентрален изглед. Този ръб при *C. coccothraustes* е с трапециовидна форма. *C. balcanicus* sp. n. има и по-ясно оформено дъговидно издуване в основата на средната част на вентралната повърхност на симфизата.

Coccothraustes simeonovi sp. n.

Холотип: humerus sinistra distalis, № NMNHS 120.

Диагноза: късноплиоценски представител на рога *Coccothraustes*, отличаващ се от recentния *C. coccothraustes* с по-дебелата си гуафиза и по-дългия epicondylus dorsalis. В каядален изглед дисталната епифиза има по-остър и по-дорзално насочен epicondylus ventralis.

Поради отсъствието на аналогични скелетни елементи на черешарките от две находища и сравнително неголямата хронологична разлика между тях (около 0,5 млн. г.) не се изключва възможността за таксономичната идентичност между *C. balcanicus* sp. n. и *C. simeonovi* sp. n., която би могла да се покаже едва след намирането на допълнителен фосилен материал.